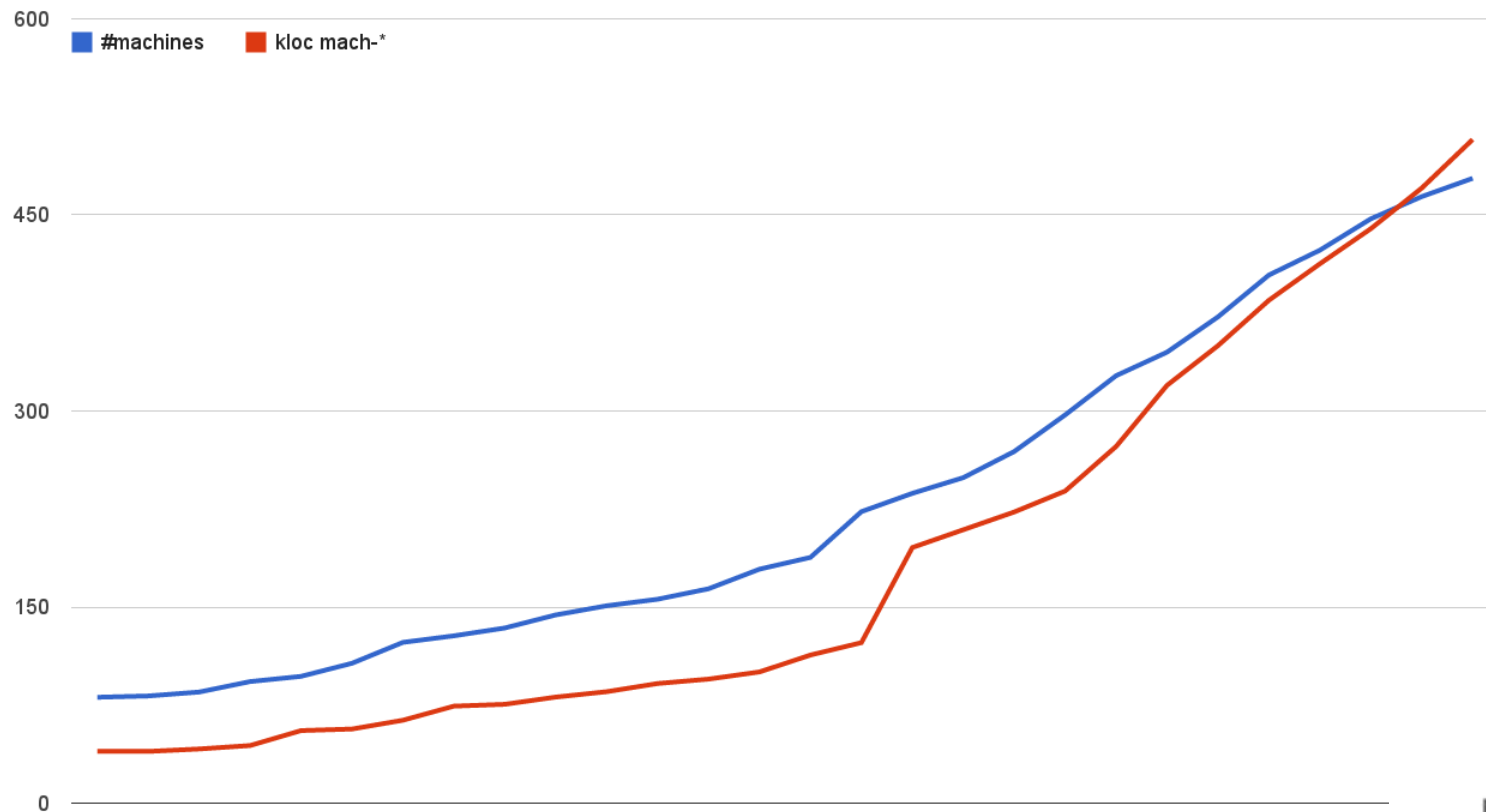


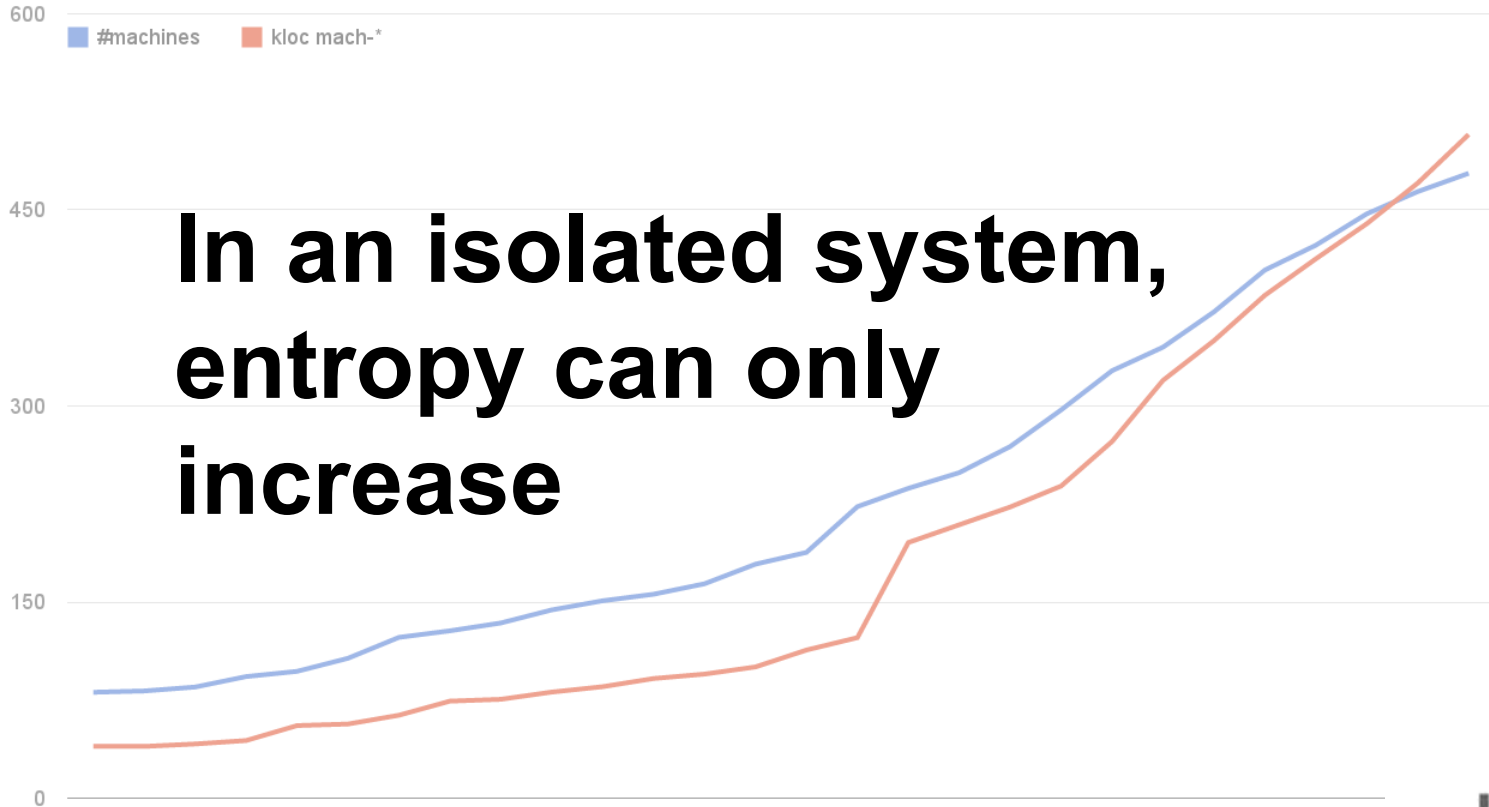
# Maintaining a large kernel subsystem

Embedded Linux Conference 2015

## Code size and supported machines

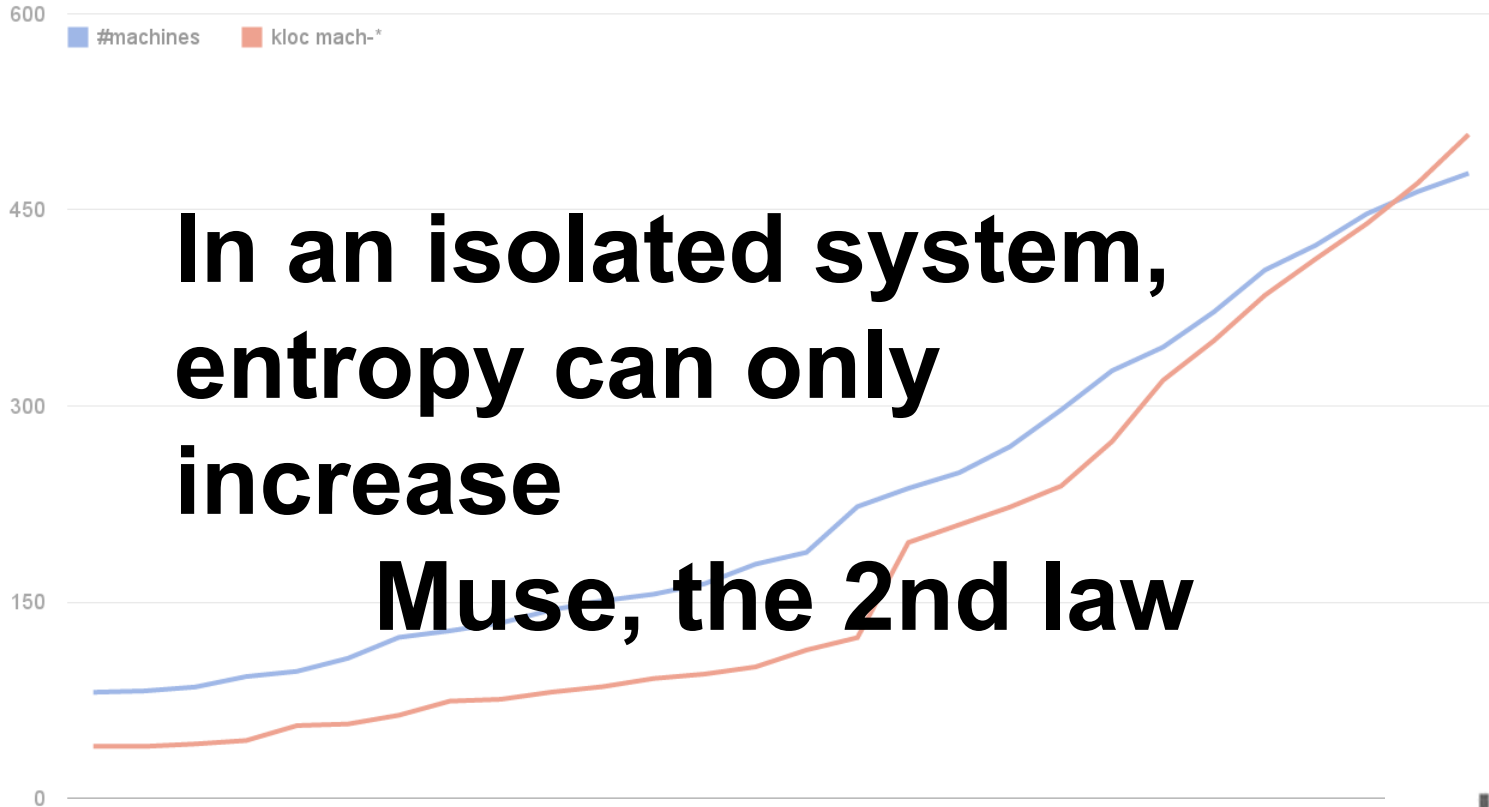


## Code size and supported machines



**In an isolated system,  
entropy can only  
increase**

## Code size and supported machines



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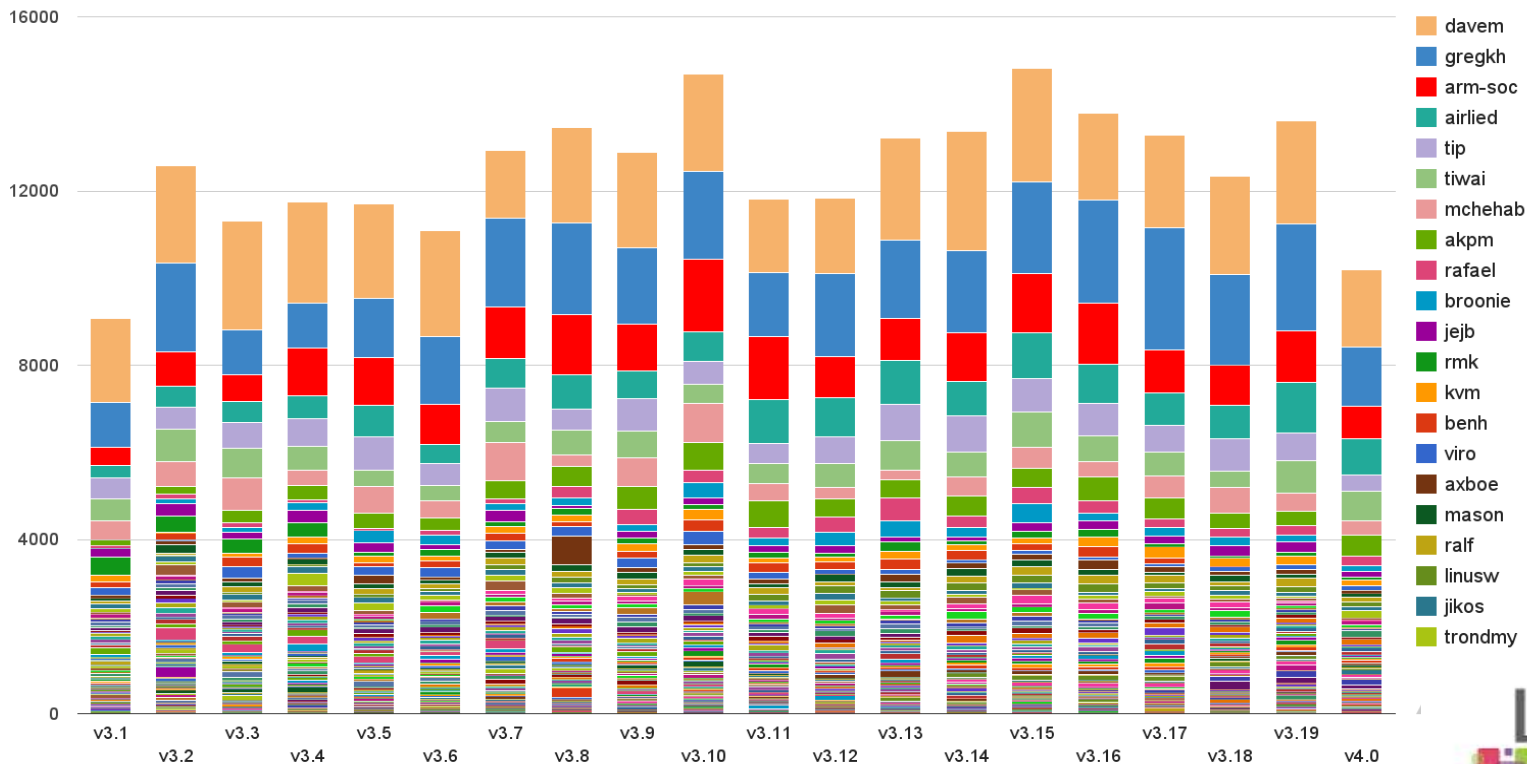
**Muse, the 2nd law**

# Overview

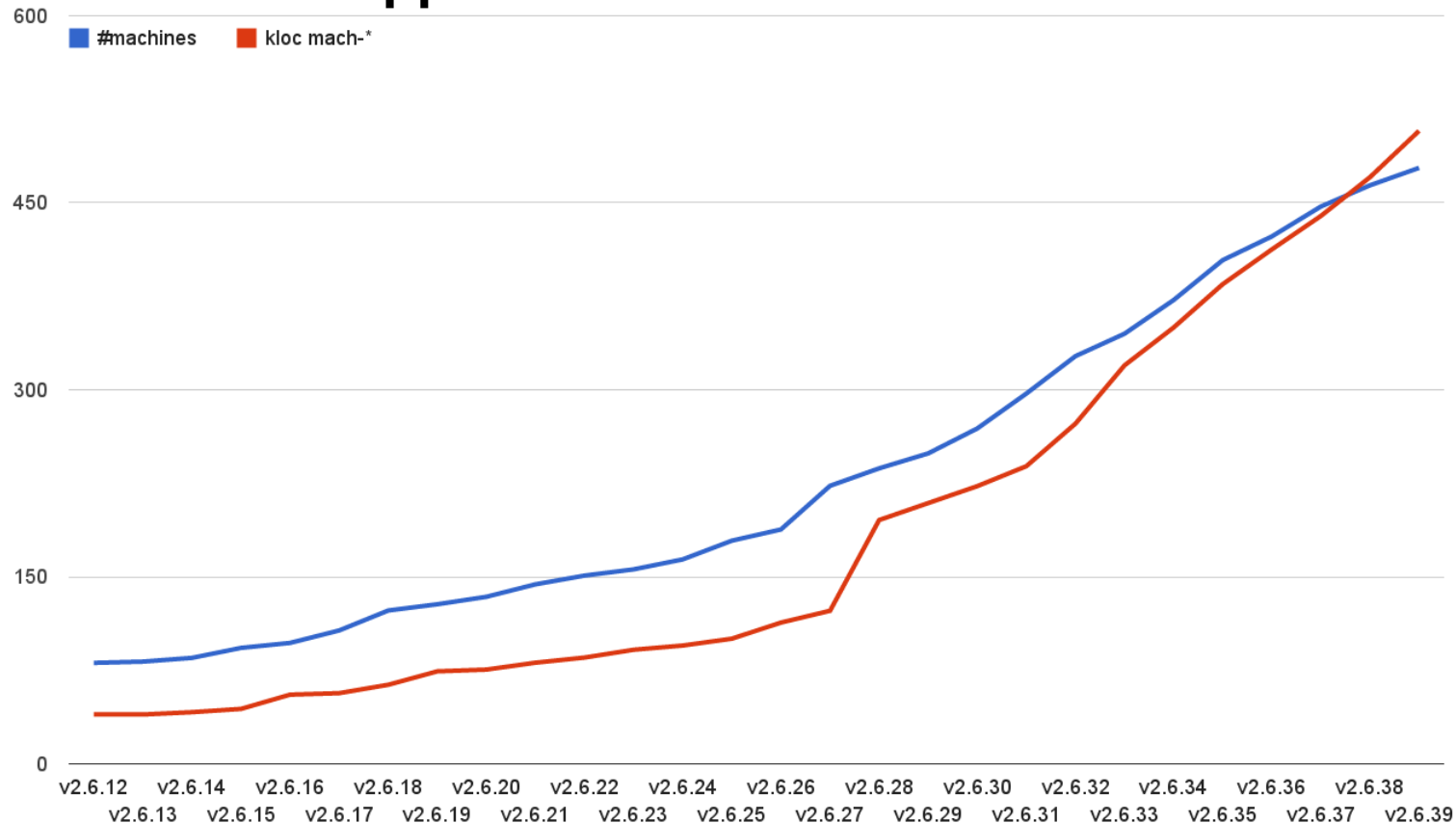
1. Setup of the arm-soc tree
2. Keeping your workload down
3. Keeping your upstream happy
4. Future outlook

# Setup of the arm-soc tree

# Changesets per kernel version and subsystem maintainer

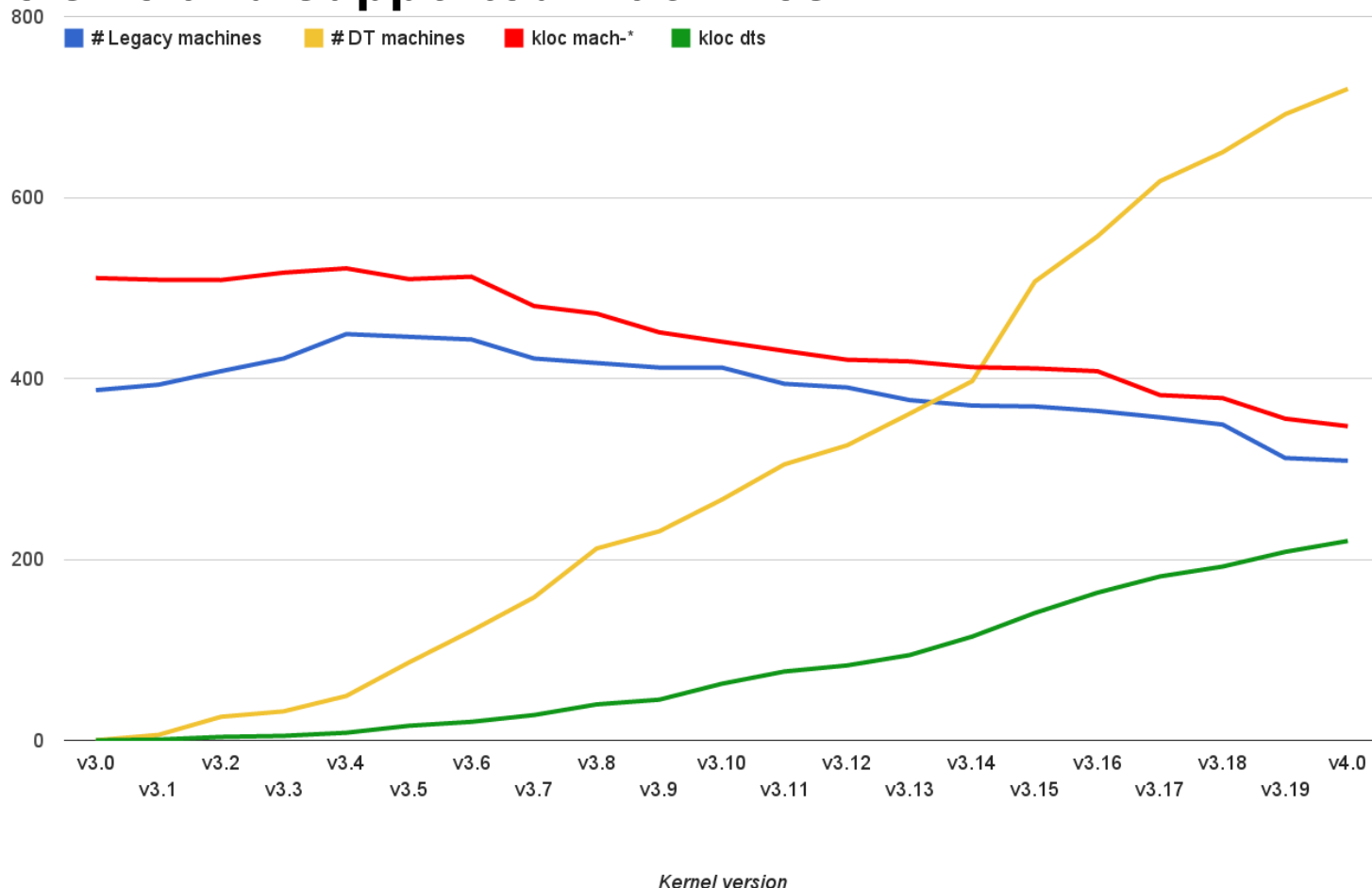


# Code size and supported machines





# Code size and supported machines



# arm-soc maintainers

Primary maintainers:

- Olof Johansson (Google)
- Arnd Bergmann (Linaro)

Backup maintainer:

- Kevin Hilman (Linaro)

# Setup of the arm-soc tree

- Shared git tree

`git://git.kernel.org/pub/scm/linux/kernel/git/arm/arm-soc.git`

- Access locking over IRC

- Documenting merges in file `arch/arm/arm-soc-for-next-contents.txt`

- One local branch per incoming pull request

- 5-15 topic branches for Linus

- One `for-next` branch for linux-next



# arm-soc-for-next-contents.txt excerpt

```
next/fixes-non-critical
    reset/fixes
        git://git.pengutronix.de/git/pza/linux reset/fixes
    omap/fixes-not-urgent
        git://git.kernel.org/pub/scm/linux/kernel/git/tmlind/linux-omap t
    patch
        ARM: msm: Silence readb/writeb warnings due to missing IOMEM()
    renesas/fixes
        git://git.kernel.org/pub/scm/linux/kernel/git/horms/renesas tags/

next/cleanup
    versatile/leds
        git://git.kernel.org/pub/scm/linux/kernel/git/linusw/linux-integr
    renesas/cleanup
        git://git.kernel.org/pub/scm/linux/kernel/git/horms/renesas tags/
        contains renesas/fixes
    patch
        leds: Fix build for LEDS CLASS=m on versatile
```



# Changesets by author

1478 Olof Johansson	406 Linus Walleij
1425 Arnd Bergmann	388 Fabio Estevam
658 Laurent Pinchart	336 Linus Torvalds
588 Tony Lindgren	312 Maxime Ripard
540 Shawn Guo	255 Paul Walmsley
453 Thomas Petazzoni	251 Simon Horman
452 Magnus Damm	244 Kevin Hilman
417 Lee Jones	241 Tomasz Figa
416 Kuninori Morimoto	235 Kukjin Kim
411 Stephen Warren	233 Alexander Shiyan

# Typical arm-soc topic branches

fixes

fixes-non-critical

cleanup

soc

defconfig

dt

board

drivers

multiplatform

arm64

# Typical arm-soc topic branches

fixes

fixes-non-critical

cleanup

soc

defconfig

dt

board

drivers

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# Typical arm-soc topic branches

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fixes-non-critical

cleanup

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defconfig

dt

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drivers

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arm64



# Example pull request

ARM: SoC platform changes

New and updated SoC support. Also included are some cleanups here the platform maintainers hadn't separated cleanups from new development in separate branches.

Some of the larger things worth pointing out:

- A large set of changes from Alexandre Belloni and Nicolas Ferre preparing at91 platforms for multiplatform and cleaning up quite a bit in the process.
- Removal of CSR's "Marco" SoC platform that never made it out to the market. We love seeing these since it means the vendor published support before product was out, which is exactly what we want!

New platforms this release are:

- Conexant Digicolor (CX92755 SoC)
- Hisilicon HiP01 SoC
- CSR/sirf Atlas7 SoC
- ST STiH418 SoC
- Common code changes for Nvidia Tegra132 (64-bit SoC)

We're seeing more and more platforms having a harder time labelling changes as cleanups vs new development -- which is a good sign that we've come quite far on the cleanup effort. So over time we might start combining the cleanup and new-development branches more.



# Keeping the workload down

# Introducing new subsystems

clk

cpufreq

cpuidle

dmaengine

gpio

iommu

irqchip

led

mailbox

pci-host

pinctrl

pwm

regulator

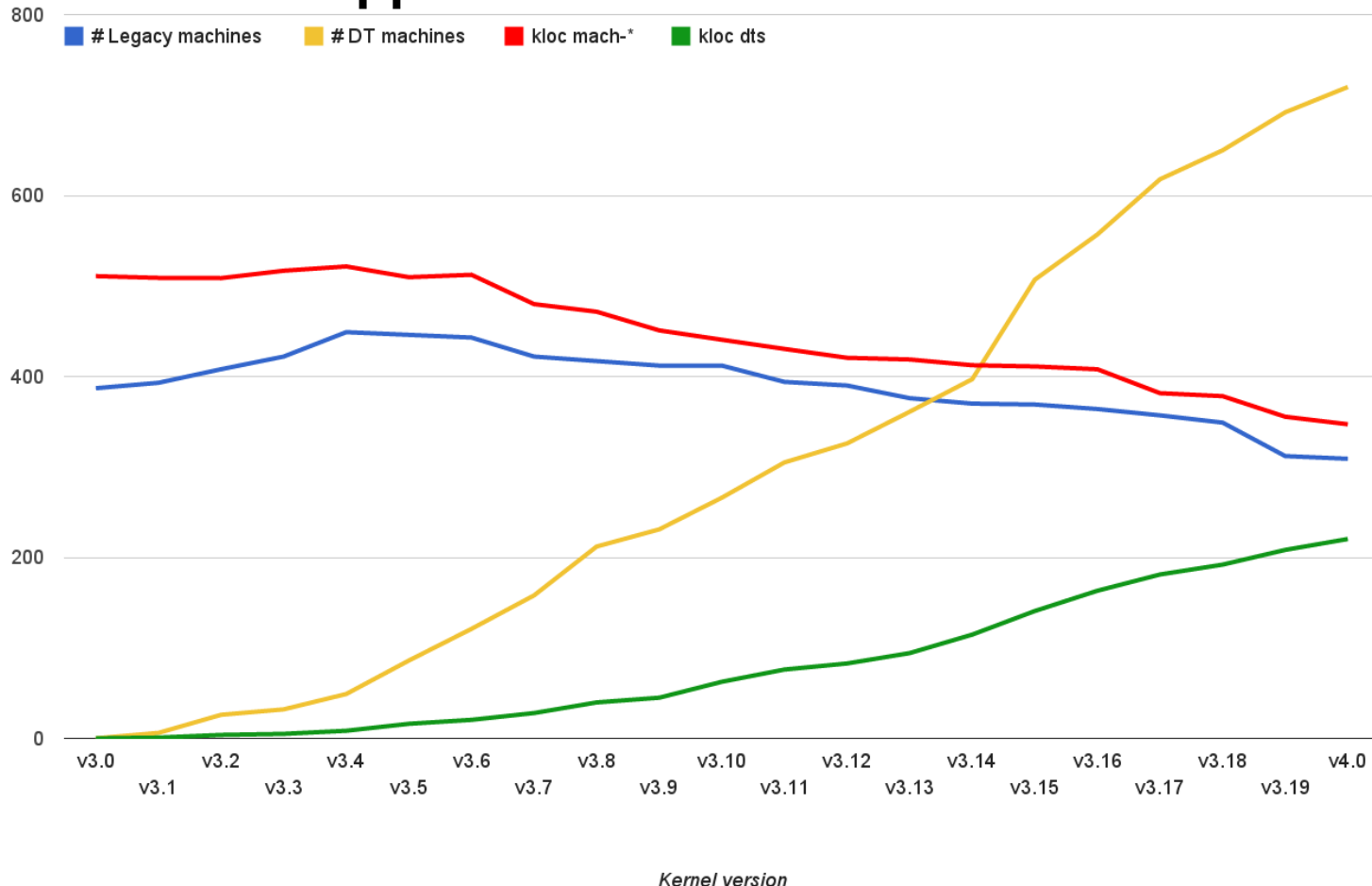
syscon

timers

# Moving boards out to devicetree

- Avoid the largest source of code explosion
- Decouple drivers from boards

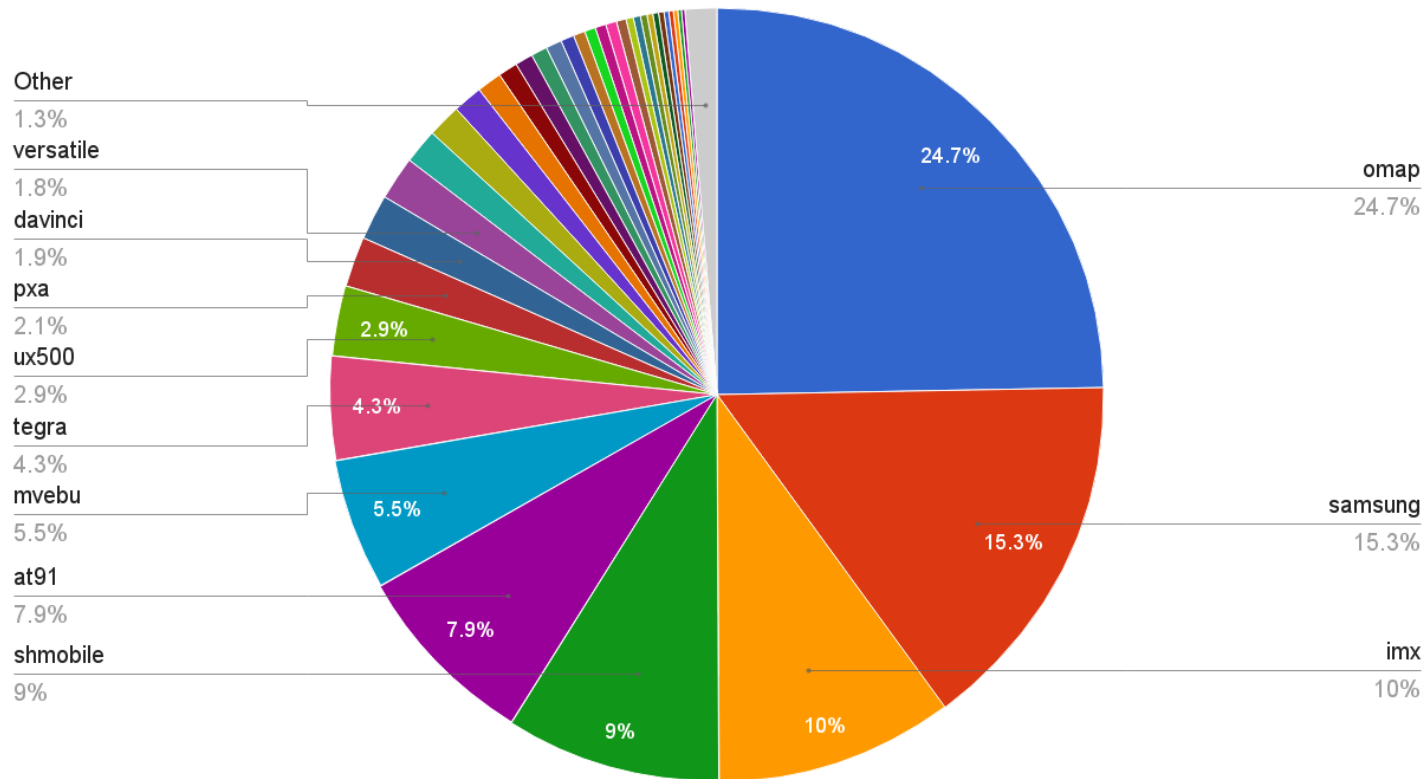
# Code size and supported machines



# Delegating to submaintainers

- Build a trusted work relationship
- Provide guidance when needed
- Special care for hobbyists

# arm-soc changes by submaintainer



# Rejecting submissions

- Most important part of the job
- Most stressful part of the job
- Only way to effect changes
- Careful balance
- Always explain what should be done instead



# Creating arbitrary rules

Undocumented arm-soc rules:

- Send pull requests to [arm@kernel.org](mailto:arm@kernel.org)
- Split changes into our topic branches
- No patch tracker / patchwork
- One maintainer per platform
- Ping us after a week if we didn't apply it

# Keeping your upstream happy

# How to make your upstream grumpy

- Send all your changes late



# How to make your upstream grumpy

- Introduce a regression and when asked about it, say it was intentional



# Side note:

## Solving cross-tree dependencies

- a. Stage out changes across multiple releases
- b. Send the same branch to multiple maintainers
- c. Make a shared branch with common changes
- d. Get an Ack from one maintainer to merge changes through another tree

# How to make your upstream grumpy

- Sneak changes in that you know are unwelcome



# Future outlook

# What's coming for 4.x



[Photo](#) by tillwe / (CC BY-SA)



# What's coming for 4.x

- Code size keeps going down
- Continue DT conversion
- Multiplatform for all ARMv6/v7
- Multiplatform for ARM9
- More arm64 platforms
- More Cortex-M platforms

# What's coming for 4.x

## Job complete before 5.0?

# Questions?